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(71) Applicant: **Beijing Xiaomi Mobile Software Co., Ltd.**
Beijing 100085 (CN)

(72) Inventors:
• **XU, Liangliang**
Beijing, 100085 (CN)

- **WEI, Xuewen**
Beijing, 100085 (CN)
- **ZHENG, Hongbin**
Beijing, 100085 (CN)
- **GAO, Zeng**
Beijing, 100085 (CN)

(74) Representative: **dompatent von Kreisler Selting**
Werner -
Partnerschaft von Patent- und Rechtsanwälten
mbB
Deichmannhaus am Dom
Bahnhofsvorplatz 1
50667 Köln (DE)

(54) **BATTERY MODULE, BATTERY MODULE PACKAGING METHOD AND TERMINAL DEVICE**

(57) The present disclosure relates to a battery module, a packaging method of the battery module, and a terminal device. The battery module includes: a battery cell component (10), including at least two battery cells arranged in a preset direction; a conductive element (20), wherein adjacent battery cells are electrically connected through the conductive element (20); and a protection circuit board (30), wherein the battery cells located at two ends of the battery cell component (10) are electrically connected to the protection circuit board (30) through corresponding tabs, respectively. The battery module of the present disclosure does not require all tabs of the battery cells to be connected to the protection circuit board, which effectively reduces space of the protection circuit board occupied due to the connection of the tabs, thereby increasing space on the protection circuit board for arranging other electrical components.

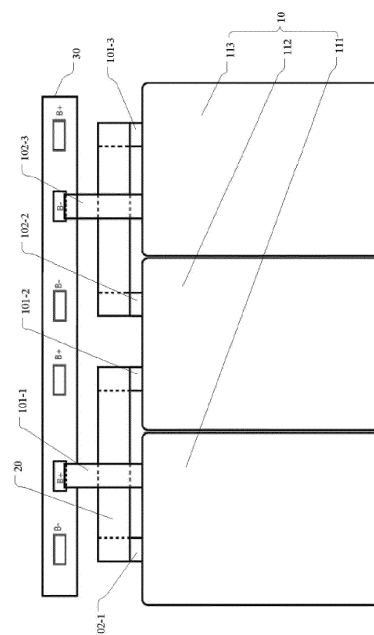


FIG. 3

Description

TECHNICAL FIELD

[0001] The present disclosure relates to the field of terminals, and in particular to a battery module, a packaging method of the battery module, and a terminal device.

BACKGROUND

[0002] With the development of technology, terminal devices such as mobile phones have increasingly more functions, and users have higher demands on the battery life of the mobile phones. In related technologies, in order to improve the battery life of mobile phones, battery modules have been gradually evolved from an original single battery cell solution to a composite battery cell solution.

[0003] In the related art, whether the composite battery cell solution is a two-cell series solution or a two-cell in parallel, two tabs of each battery cell in the composite battery cell need to be connected to the same protection circuit board. Since when each tab is connected to the protection circuit board, a welding plate is required. Therefore, respective welding plates occupy large space on the protection circuit board, which severely limits the layout and wiring of the protection board, resulting in serious reduction of the space for arranging other electrical components on the protection circuit board.

SUMMARY

[0004] In order to overcome the problems in the related art, the present disclosure provides a battery module, a packaging method of the battery module, and a terminal device.

[0005] According to a first aspect of the present disclosure, there is provided a battery module, including:

a battery cell component, including at least two battery cells arranged in a preset direction;
a conductive element, wherein adjacent battery cells are electrically connected through the conductive element; and
a protection circuit board, wherein the battery cells located at two ends of the battery cell component are electrically connected to the protection circuit board through corresponding tabs, respectively.

[0006] Optionally, each of the battery cells includes a positive tab and a negative tab;
a positive tab of the battery cell at one end of the battery cell component is electrically connected to the protection circuit board, and a negative tab of the battery cell at the other end of the battery cell component is electrically connected to the protection circuit board;
a negative tab of adjacent one battery cell is electrically connected to a positive tab of adjacent another battery cell through the conductive element.

[0007] Optionally, the conductive element is coated outside the positive tab and/or the negative tab; and a first part of the conductive element is located on a first surface side of the battery cell, a second part of the conductive element is located on a second surface side of the battery cell.

[0008] Optionally, an insulating layer is provided outside the conductive element.

[0009] Optionally, the insulating layer includes insulating glue and/or foam.

[0010] Optionally, the conductive element includes: a connecting part and a detecting part, wherein one end of the detecting part is connected to the connecting part, and the other end of the detecting part is electrically connected to the protection circuit board; and the connecting part is connected to the battery cell.

[0011] Optionally, the connecting part extends along the preset direction, and two ends of the connecting part are used to connect to tabs of the battery cell; and the detecting part is located at a preset position of the connecting part.

[0012] Optionally, the conductive element includes a conductor made of copper plating nickel.

[0013] According to a second aspect of the present disclosure, there is provided a packaging method of a battery module, applied to the battery module of any one of the above, wherein the packaging method includes:

controlling at least two battery cells in a battery cell component to be arranged and positioned in a preset direction;

controlling adjacent battery cells to be electrically connected through a conductive element;

controlling the battery cells at two ends of the battery cell component to be electrically connected to the protection circuit board through corresponding tabs, respectively.

[0014] Optionally, the controlling adjacent battery cells to be electrically connected through a conductive element includes:

on a first surface side of the battery cell, controlling one end of the conductive element to be electrically connected to a negative tab of one battery cell, and controlling the other end of the conductive element to be electrically connected to a positive tab of adjacent another battery cell;

controlling the conductive element to be folded from the first surface side to a second surface side of the battery cell, to coat the positive tab and/or the negative tab;

controlling a detecting part of the conductive element to be electrically connected with the protection circuit board.

[0015] Optionally, the method further includes: controlling the protection circuit board to be folded to-

wards a direction of the battery cell, to cover the conductive element.

[0016] According to a third aspect of the present disclosure, there is provided a terminal device, including the battery module according to any one of the above.

[0017] The technical solutions provided by the embodiments of the present disclosure include the following beneficial effects: in the battery module of the present disclosure, the adjacent battery cells are electrically connected through conductive elements; the battery cells located at two ends of the battery cell component are connected with the protection circuit board through the tabs. It is not necessary for tabs of all battery cells to be connected to the protection circuit board, which effectively reduces space of the protection circuit board occupied due to the connection of the tabs, thereby increasing space on the protection circuit board for arranging other electrical components.

[0018] It should be noted that the above general description and the following detailed description are merely exemplary and explanatory and should not be construed as limiting of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The drawings here are incorporated into the specification and constitute a part of the specification, show embodiments in accordance with the present disclosure, and together with the specification are used to explain the principle of the present disclosure.

FIG. 1 is a schematic diagram of the layout of a terminal device in the related art.

FIG. 2 is a schematic diagram showing a battery module according to an exemplary embodiment.

FIG. 3 is a schematic diagram showing a battery module according to an exemplary embodiment.

FIG. 4 is a schematic diagram showing a conductive element according to an exemplary embodiment.

FIG. 5 is a schematic diagram showing the assembly of the battery module during the packaging process according to an exemplary embodiment.

FIG. 6 is a schematic diagram showing the assembly of the battery module during the packaging process according to an exemplary embodiment.

FIG. 7 is a schematic diagram showing the assembly of the battery module during the packaging process according to an exemplary embodiment.

FIG. 8 is a flow chart showing a method according to an exemplary embodiment.

FIG. 9 is a flow chart showing a method according to an exemplary embodiment.

DETAILED DESCRIPTION

[0020] The exemplary embodiments will be described in detail here, and examples thereof are shown in the accompanying drawings. When the following description

refers to the drawings, unless otherwise indicated, the same numbers in different drawings indicate the same or similar elements. The implementation manners described in the following exemplary embodiments do not represent all implementation manners consistent with the present disclosure. On the contrary, they are merely examples of apparatuses and methods consistent with some aspects of the present disclosure as detailed in the appended claims.

[0021] With the development of technology, terminal devices such as mobile phones have more and more functions, and users have higher and higher requirements on the battery life of the mobile phones. In related technologies, in order to improve the battery life of mobile phones, battery modules have been gradually developed from an original single battery cell solution to a composite battery cell solution.

[0022] In the related art, whether the composite battery cell solution is a two-cell series solution or a two-cell in parallel, two tabs of each battery cell in the composite battery cell need to be connected to the same protection circuit board. In the related art, the layout of the terminal device often adopts a three-stage layout. That is, as shown in FIG. 1, from the top to the bottom of the terminal device, there are a main board area 10', a battery area 20', and a small board area 30' successively. The battery area 20' is used for arranging battery modules. In conjunction with FIG. 1, it can be seen that the space for arranging battery modules in the terminal device is limited.

[0023] If the composite battery cells are effectively installed in the battery area 20', the protection circuit board needs to take into account tabs of all the battery cells, and its size will inevitably increase. In order to arrange a large-size protection circuit board, the battery cells in the composite battery cell solution are mostly arranged side by side along a length direction (Y direction) of the terminal device.

[0024] As can be seen from the above, in the arrangement of battery cells in the related art, the two tabs of each battery cell are connected to the same protection circuit board of the long strip shape. Since when each tab is connected to the protection circuit board, a welding plate is required. Therefore, respective welding plates occupy large space on the protection circuit board, which severely limits the layout and wiring of the protection board, resulting in serious reduction of the space for arranging other electrical components on the protection circuit board.

[0025] In order to ensure the effective layout of all required electrical components on the protection circuit board, the protection circuit board has to be further increased in size. In the limited space for arranging the battery module, the larger the size of the protection circuit board is, the smaller the size of the battery cell is, resulting in decreased battery capacity. It is contrary to the design concept of high battery capacity and a reasonable size of a terminal device.

[0026] In order to solve problems in the related art, the present disclosure proposes a battery module, including: a battery cell component, including at least two battery cells arranged in a preset direction; a protection circuit board, wherein the battery cells located at two ends of the battery cell component are electrically connected to the protection circuit board through corresponding tabs, respectively; and a conductive element, wherein adjacent battery cells are electrically connected through the conductive element. In the battery module of the present disclosure, the adjacent battery cells are electrically connected through conductive elements; the battery cells located at two ends of the battery cell component are connected with the protection circuit board through the tabs. It is not necessary for tabs of all battery cells to be connected to the protection circuit board, which effectively reduces space of the protection circuit board occupied due to the connection of the tabs, thereby increasing space on the protection circuit board for arranging other electrical components.

[0027] In an exemplary embodiment, as shown in FIGS. 2 to 7, the battery module of this embodiment includes: a battery cell component 10, a conductive element 20 and a protection circuit board 30. The battery cell component 10 includes at least two battery cells 11 arranged in a preset direction. The adjacent battery cells 11 are electrically connected through the conductive element 20. In the embodiment, the preset direction may be, for example, a length direction (Y direction) or a width direction (X direction) of the terminal device. The arrangement of the battery cells 11 refers to the arrangement of the battery cells 11 side by side, that is, respective battery cells 11 are arranged in sequence and the tabs of the respective battery cells 11 are all on the same side. For example, the tabs of each battery cell 11 are located on the upper side of the battery cell 11, and the protection circuit board 30 can be arranged on the upper side of the battery cell 11 at this time. The protection circuit board 30 may include, for example, a PCB (printed circuit board) and electrical components thereon.

[0028] As can be seen in combination with FIG. 2 or FIG. 3, in this embodiment, the battery cells 11 located at the two ends of the battery cell component 10 are connected to the protection circuit board 30 through their corresponding tabs. For example, the battery cell 11 located at one end of the battery cell component 10 is connected to the protection circuit board 30 through its positive or negative tab, and the battery cell 11 located at the other end of the battery cell component 10 is connected to the protection circuit board through its negative or positive tab. The remaining tabs of the battery cell 11 do not need to be connected to the protection circuit board 30, which effectively saves the space on the protection circuit board 30.

[0029] In this embodiment, since the connection manner of the battery cell 11 effectively saves the space of the protection circuit board 30, the size of the protection circuit board 30 can also be appropriately reduced. At

this time, the preset direction can be set as the width direction (X direction) of the terminal device, that is, the battery cells 11 are arranged side by side along the width direction. Correspondingly, the protection circuit board 30 extends in the width direction, which effectively shortens the length compared with the related art, thereby reserving more space for the battery cell component 10.

[0030] In an exemplary embodiment, still referring to FIG. 2 or FIG. 3, each battery cell 11 includes a positive tab 101 and a negative tab 102. In the preset direction, the battery cells 11 in the battery cell component 10 can be arranged from high potential to low potential. For example, the positive tab 101 of the battery cell 11 of the high potential and the negative tab 102 of the battery cell 11 of the low potential are connected to the protection circuit board 30.

[0031] In this embodiment, the positive tab 101 of the battery cell (high potential) at one end of the battery cell component 10 is electrically connected to the protection circuit board 30, and the negative tab 102 of the battery cell (low potential) at the other end of the battery cell component 10 is electrically connected to the protection circuit board 30. The negative tab 102 of adjacent one battery cell is electrically connected to the positive tab 101 of adjacent another battery cell through the conductive element 20. In the embodiment, the length of the negative tab 102 or the positive tab 101 of the battery cell can be cut and adjusted as required. For details, please refer to the following examples.

[0032] In an example, as shown in FIG. 2, the battery cell component 10 includes two battery cells arranged along the width direction of the terminal device, namely a first battery cell 111 and a second battery cell 112, wherein the first battery cell 111 is a high-potential battery cell. One conductive element 20 is included in this example.

[0033] The positive tab 101-1 of the first battery cell 111 is connected to the positive port (B+) of the protection circuit board 30, and the negative tab 102-2 of the second battery cell 112 is connected to the negative port (B-) of the protection circuit board 30. The negative tab 102-1 of the first battery cell 111 and the positive tab 101-2 of the second battery cell 112 are connected through the conductive element 20.

[0034] Compared with the related art, in this example, there are only two tabs connected to the protection circuit board 30, so only two welding nickel plates need to be provided on the protection circuit board 30, which effectively reduces the number of welding nickel plates. Therefore, the space of the protection circuit board 30 is saved, and it is convenient to arrange other electrical components on the protection circuit board 30. In addition, the battery cells are arranged along the width direction of the terminal device, and the length of the protection circuit board 30 is also effectively shortened compared with the related art, which can reserve sufficient space for the battery cell component 10, which is beneficial to increase the size of the battery cells and improve the battery ca-

capacity.

[0035] In another example, as shown in FIG. 3, the battery cell component 10 includes three battery cells arranged along the width direction of the terminal device, namely a first battery cell 111, a second battery cell 112, and a third battery cell 113, wherein the first battery cell 111 is a high-potential battery cell, the third battery cell 113 is a low-potential battery cell, and the potential of the second battery cell 112 is located between them two. Two conductive elements 20 are included in this example.

[0036] The positive tab 101-1 of the first battery cell 111 is connected to the positive port (B+) of the protection circuit board 30, and the negative tab 102-3 of the third battery cell is connected to the negative port (B-) of the protection circuit board 30. The negative tab 102-1 of the first battery cell 111 and the positive tab 101-2 of the second battery cell 112 are connected through a conductive element 20, and the negative tab 102-2 of the second battery cell 112 and the positive tab 101-3 of the third battery cell 113 are connected through another conductive element 20.

[0037] In the manner of three battery cells in this example, there are also only two tabs connected to the protection circuit board 30, which effectively saves the space of the protection circuit board 30, and it is convenient to arrange other electrical components on the protection circuit board 30. In addition, the battery cells 11 are arranged along the width direction of the terminal device, and the length of the protection circuit board 30 is also effectively shortened compared with the related art, which can reserve sufficient space for the battery cell component 10.

[0038] In other examples, when the number of battery cells 11 is greater than three, the connection manner of the present disclosure can ensure that only the tabs at two ends of the battery cell component 10 are connected to the protection circuit board 30, and the tabs of the battery cell 11 in the middle achieves the electrical connection through the conductive element 20. Only the area occupied by two welding nickel plates is remained on the protection circuit board 30, which saves the space of the protection circuit board 30 to the utmost extent.

[0039] In an exemplary embodiment, as shown in FIG. 4, the conductive element 20 may be, for example, a conductive sheet. When the conductive element 20 is used to realize the connection of the tabs of the adjacent battery cells 11, the conductive element 20 is coated outside the positive tab 101 and/or the negative tab 102. It can be seen from FIG. 6 or FIG. 7 that the first part of the conductive element 20 is located on the first surface side of the battery cell 11, and the second part of the conductive element 20 is located on the second surface side of the battery cell 11. In the embodiment, the second surface may be, for example, a shallow pit surface of the battery cell 11 (the back surface of the battery cell in the current state shown in the figure). There is an interval between the plane where the shallow pit surface is locat-

ed and the tab.

[0040] In this embodiment, after the conductive element 20 clads the positive tab 101 and the negative tab 102 on the first surface side of the battery cell 11, the conductive element 20 can be folded to the second surface side of the battery cell 11. It uses the distance between the tab and the surface of the battery cell 11 to accommodate the conductive element 20, which effectively reduces the space occupied by the conductive element 20 on the basis of reasonably using the space. In addition, folding the conductive element 20 to the shallow pit surface of the battery cell can disperse the heat of the battery cell and reduce the temperature rise of the protection circuit board 30 and the battery module.

[0041] In an exemplary embodiment, an insulating layer is provided outside the conductive element 20. After the conductive element 20 is coated on the tabs of the battery cell 11, the insulating work of the conductive element 20 needs to be done, and an insulating layer is coated outside the conductive element 20.

[0042] In this embodiment, for example, insulating double-sided tape or foam with glue can be used outside the conductive element 20, to stick and reinforce the conductive element 20. It not only meets the insulation requirements of the outer side of the conductive element 20, but also ensures the reliability of the battery module during the drop process of the battery module or the terminal device.

[0043] In an exemplary embodiment, as shown in FIG. 4, the conductive element 20 includes: a connecting part 201 and a detecting part 202. One end of the detecting part 202 is connected to the connecting part 201, and the other end of the detecting part 202 is electrically connected to the protection circuit board 30. The connecting part 201 is connected to the battery cell 11.

[0044] In this embodiment, with reference to FIGS. 6 to 7, the connecting part 201 may be connected to the tab of the battery cell 11 (for example, by welding). After the conductive element 20 is turned over from the first surface of the battery cell 11 to the second surface side of the battery cell 11, the connecting part 201 may be in contact with or connected to the second surface of the battery cell 11.

[0045] In an exemplary embodiment, still referring to FIG. 4, the connecting part 201 extends in a predetermined direction, and two ends of the connecting part 201 are used to connect to the tabs of the battery cell 11. In this embodiment, the detecting part 202 is located at a preset position of the connecting part 201. The preset position may be, for example, a structural center of the connecting part 201, i.e., a middle position of the connecting part in its extending direction.

[0046] In the embodiment, welding positions can be reserved at two ends of the connecting part 201, and the tabs of the battery cell 11 are welded to the welding positions of the connecting part 201. For example, in conjunction with FIG. 2, in an example in which the battery cell component 10 includes two battery cells 11, one end

of the connecting part 201 is welded to the negative tab 102-1 of the first battery cell 111, and the other end of the connecting part 201 is welded to the positive tab 101-2 of the second battery cell 112.

[0047] The detecting part 202 is connected to the protection circuit board 30 to detect the voltage of the battery cell 11. For example, with reference to FIG. 2, in an example in which the battery cell component 10 includes two battery cells 11, the voltage of the first battery cell 111 is detected by connecting the detecting part 202 to the negative tab 102-1 of the first battery cell 111. The voltage of the second battery cell 112 is detected by connecting the detecting part 202 to the positive tab 101-2 of the second battery cell 112.

[0048] In this embodiment, the conductive element 20 may adopt a conductor made of copper plating nickel, which is punched and molded at one time. The impedance of the conductive element 20 is effectively reduced.

[0049] In an exemplary embodiment, the present disclosure also proposes a packaging method of a battery module, which is applied to the battery module related to the above-mentioned embodiments. As shown in FIG. 8, the packaging method includes following steps:

S110, controlling at least two battery cells in a battery cell component to be arranged and positioned in a preset direction;

S120, controlling adjacent battery cells to be electrically connected through a conductive element;

S130, controlling the battery cells at two ends of the battery cell component to be electrically connected to the protection circuit board through corresponding tabs, respectively.

[0050] In step S110, the preset direction may be, for example, the length direction or the width direction of the terminal device. In this embodiment, the preset direction is the width direction of the terminal device. Referring to FIGS. 2-7, at least two battery cells 11 are arranged side by side in the width direction. The tabs of each battery cell 11 are located on the same side.

[0051] In step S120, the tabs of adjacent battery cells may be connected by conductive elements. For example, the positive tab or the negative tab of a battery cell is connected to the negative tab or the positive tab of an adjacent battery cell. For example, as shown in FIG. 2, in an example in which the battery cell component 10 includes two battery cells 11, the negative tab 102-1 of the first battery cell 111 is connected to one end of the conductive element 20, and the other end of the conductive element 20 is connected to the positive tab 101-2 of the second battery cell 112.

[0052] As shown in FIG. 9, the step S120 in this embodiment specifically includes following steps.

[0053] S1201, on a first surface side of the battery cell, one end of the conductive element is controlled to be electrically connected to a negative tab of one battery cell, and the other end of the conductive element is con-

trolled to be electrically connected to a positive tab of adjacent another battery cell.

[0054] In the embodiment, as shown in FIG. 5 to 7, during the connection process, the size of the tab can be adjusted adaptively. For example, the positive tab 101 with a longer length is reserved for connection with the protection circuit board 30. The tab (not marked in the figure and covered by the conductive element 20) is cut to an appropriate length to be connected to the conductive element 20.

[0055] The connection manner may be, for example, using a jig to fix the conductive element 20 and the tabs of the battery cell 11, and using laser welding to weld the tabs and the conductive element 20 together. In this welding process, as shown in FIG. 5, the tabs (the positive tab 101-1 and negative tab 102-3 marked in the figure) connected to the protection circuit board 30 and the detecting part 202 of the conductive element 20 should be lifted to make way.

[0056] S1202, the conductive element is controlled to be folded from the first surface side to a second surface side of the battery cell, to coat the positive tab and/or the negative tab.

[0057] In the embodiment, referring to FIGS. 5 to 7, during the folding process, the tabs (the positive tab 101-1 and negative tab 102-3 marked in the figure) connected to the protection circuit board 30 and the detecting part 202 of the conductive element 20 should also be lifted to make way.

[0058] After the folding, the conductive element 20 should be insulated and fixed. For example, double-sided tape and foam glue can be used to fix the conductive sheet, to meet the insulation requirements while ensuring the reliability of the battery or a terminal device when it is dropped.

[0059] S1203, a detecting part of the conductive element is controlled to be electrically connected with the protection circuit board.

[0060] In the embodiment, referring to FIG. 7, the detecting part 202 of the conductive element 20 is connected to a preset interface of the protection circuit board 30, to realize the voltage detection of the battery cell.

[0061] In step S130, only the corresponding tabs of the battery cells located at two ends of the battery cell component are connected to the protection circuit board 30.

[0062] For example, as shown in FIG. 3, the battery cell 111 located at one end of the battery cell component 10 is connected to the protection circuit board 30 through its positive tab 101-1, and the battery cell 113 located at the other end of the battery cell component 10 is connected to the protection circuit board through its negative tab 102-3. The remaining tabs of the battery cell 11 do not need to be connected to the protection circuit board 30, which effectively saves the space on the protection circuit board 30.

[0063] In the above steps, in the process of connecting each component, the battery cell 11, the conductive element 20 and the protection circuit board 30 can be fixed

and positioned using a jig, and then a laser welding manner may be adopted to connect the tabs of the battery cell 11 and the protection circuit board 30, the tabs and the conductive element 20, and the detecting part 202 of the conductive element 20 and the protection circuit board 30.

[0064] In an exemplary embodiment, still referring to FIG. 8, the method of this embodiment further includes:

[0065] S140, controlling the protection circuit board to be folded towards a direction of the battery cell, to cover the conductive element.

[0066] In the embodiment, the protection circuit board 30 is folded to cover the conductive element 20, and then all the components are fixed with adhesive paper, to complete the packaging of the battery module.

[0067] In an exemplary embodiment, the present disclosure proposes a terminal device, including the battery module involved in the foregoing embodiments.

[0068] Those skilled in the art will easily think of other embodiments of the present disclosure after considering the specification and practicing the disclosure disclosed herein. This application is intended to cover any variations, uses, or adaptive changes of the present disclosure. These variations, uses, or adaptive changes follow the general principles of the present disclosure and include common knowledge or conventional technical means in the technical field not disclosed in this disclosure. The description and the embodiments are to be regarded as exemplary only, and the true scope and spirit of the present disclosure are pointed out by the following claims.

[0069] It should be understood that the present disclosure is not limited to the precise structure that has been described above and shown in the drawings, and various modifications and changes can be made without departing from its scope. The scope of the present disclosure is only limited by the appended claims.

Claims

1. A battery module, comprising:

a battery cell component (10), comprising at least two battery cells (11) arranged in a preset direction;
a conductive element (20), wherein adjacent battery cells (11) are electrically connected through the conductive element (20); and
a protection circuit board (30), wherein battery cells located at two ends of the battery cell component (10) are electrically connected to the protection circuit board (30) through corresponding tabs, respectively.

2. The battery module according to claim 1, wherein each of the battery cells (11) comprises a positive tab (101) and a negative tab (102);

a positive tab (101) of the battery cell (11) at one end of the battery cell component (10) is electrically connected to the protection circuit board (30), and a negative tab (102) of the battery cell (11) at the other end of the battery cell component (10) is electrically connected to the protection circuit board (30); and a negative tab (102) of adjacent one battery cell (11) is electrically connected to a positive tab (101) of adjacent another battery cell (11) through the conductive element (20).

3. The battery module according to claim 2, wherein the conductive element (20) is coated outside the positive tab (101) and/or the negative tab (102); and a first part of the conductive element (20) is located on a first surface side of the battery cell (11), and a second part of the conductive element (20) is located on a second surface side of the battery cell (11).

4. The battery module according to any one of claims 1 to 3, wherein an insulating layer is provided outside of the conductive element (20).

5. The battery module according to claim 4, wherein the insulating layer comprises insulating glue and/or foam.

6. The battery module according to any one of claims 1 to 5, wherein the conductive element (20) comprises: a connecting part (201) and a detecting part (202), wherein one end of the detecting part (202) is connected to the connecting part (201), and the other end of the detecting part (202) is electrically connected to the protection circuit board (30); and the connecting part (201) is connected to the battery cell (11).

7. The battery module according to claim 6, wherein the connecting part (201) extends along the preset direction, and two ends of the connecting part (201) are used to connect to tabs of the battery cell (11); and the detecting part (202) is located at a preset position of the connecting part (201).

8. The battery module according to any one of claims 1 to 7, wherein the conductive element (20) comprises a conductor made of copper plating nickel.

9. A packaging method of a battery module, applied to the battery module of any one of claims 1 to 8, wherein the packaging method comprises:

controlling (S110) at least two battery cells in a battery cell component to be arranged and positioned in a preset direction;
controlling (S120) adjacent battery cells to be electrically connected through a conductive el-

ement; and
controlling (S130) the battery cells at two ends
of the battery cell component to be electrically
connected to the protection circuit board through
corresponding tabs, respectively.

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10. The packaging method of the battery module according to claim 9, wherein the controlling (S120) adjacent battery cells to be electrically connected through a conductive element comprises:

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on a first surface side of the battery cell, controlling (S1201) one end of the conductive element to be electrically connected to a negative tab of one battery cell, and controlling the other end of the conductive element to be electrically connected to a positive tab of adjacent another battery cell;

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controlling (S1202) the conductive element to be folded from the first surface side to a second surface side of the battery cell, to coat the positive tab and/or the negative tab;

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controlling (S1203) a detecting part of the conductive element to be electrically connected with the protection circuit board.

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11. The packaging method of the battery module according to claim 9 or 10, further comprising:

controlling (S140) the protection circuit board to be folded towards a direction of the battery cell, to cover the conductive element.

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12. A terminal device, comprising the battery module according to any one of claims 1 to 8.

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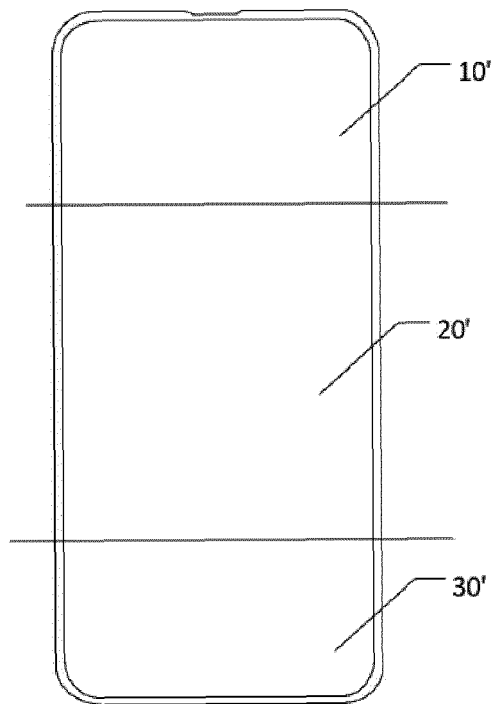


FIG. 1 (Prior art)

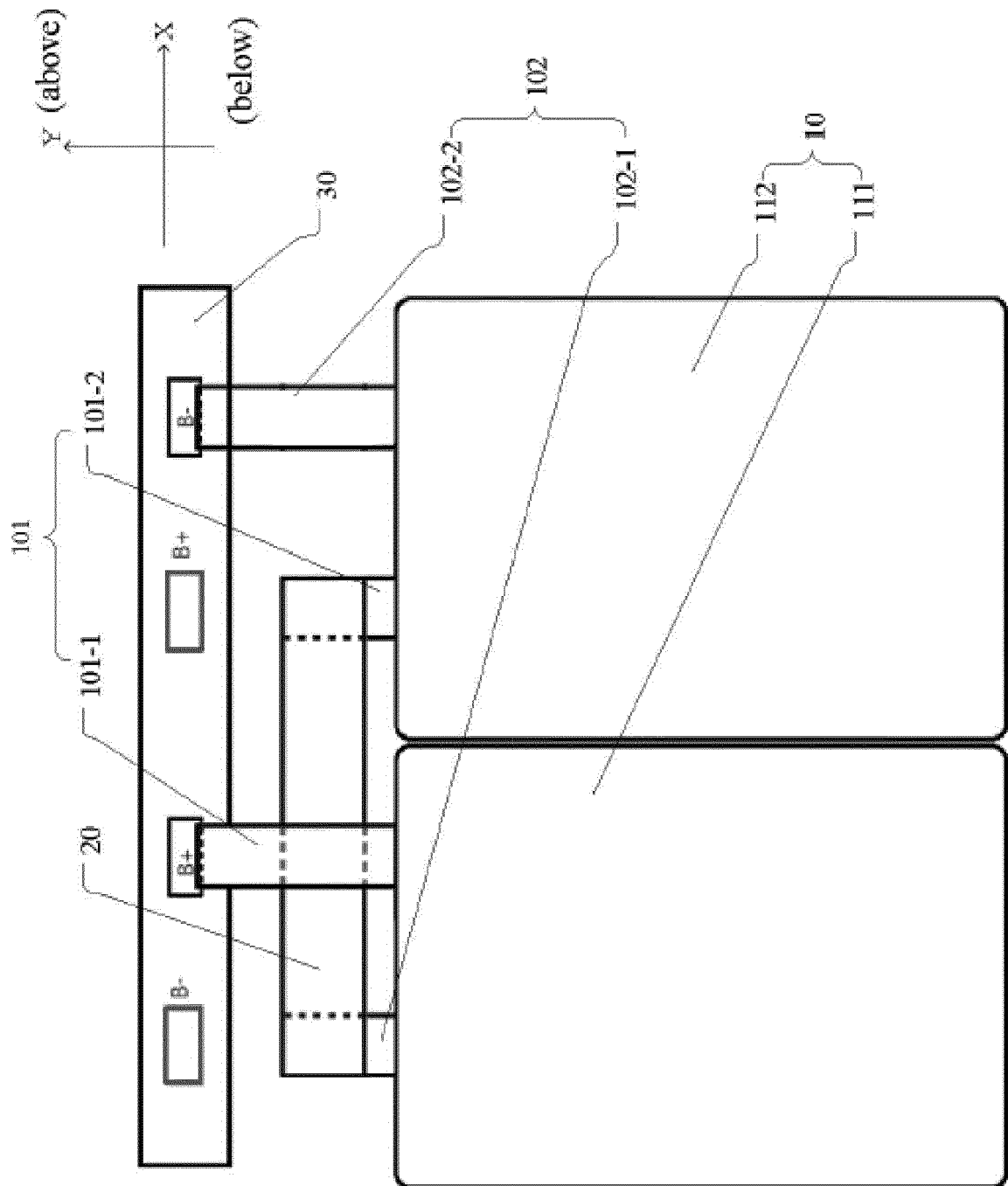


FIG. 2

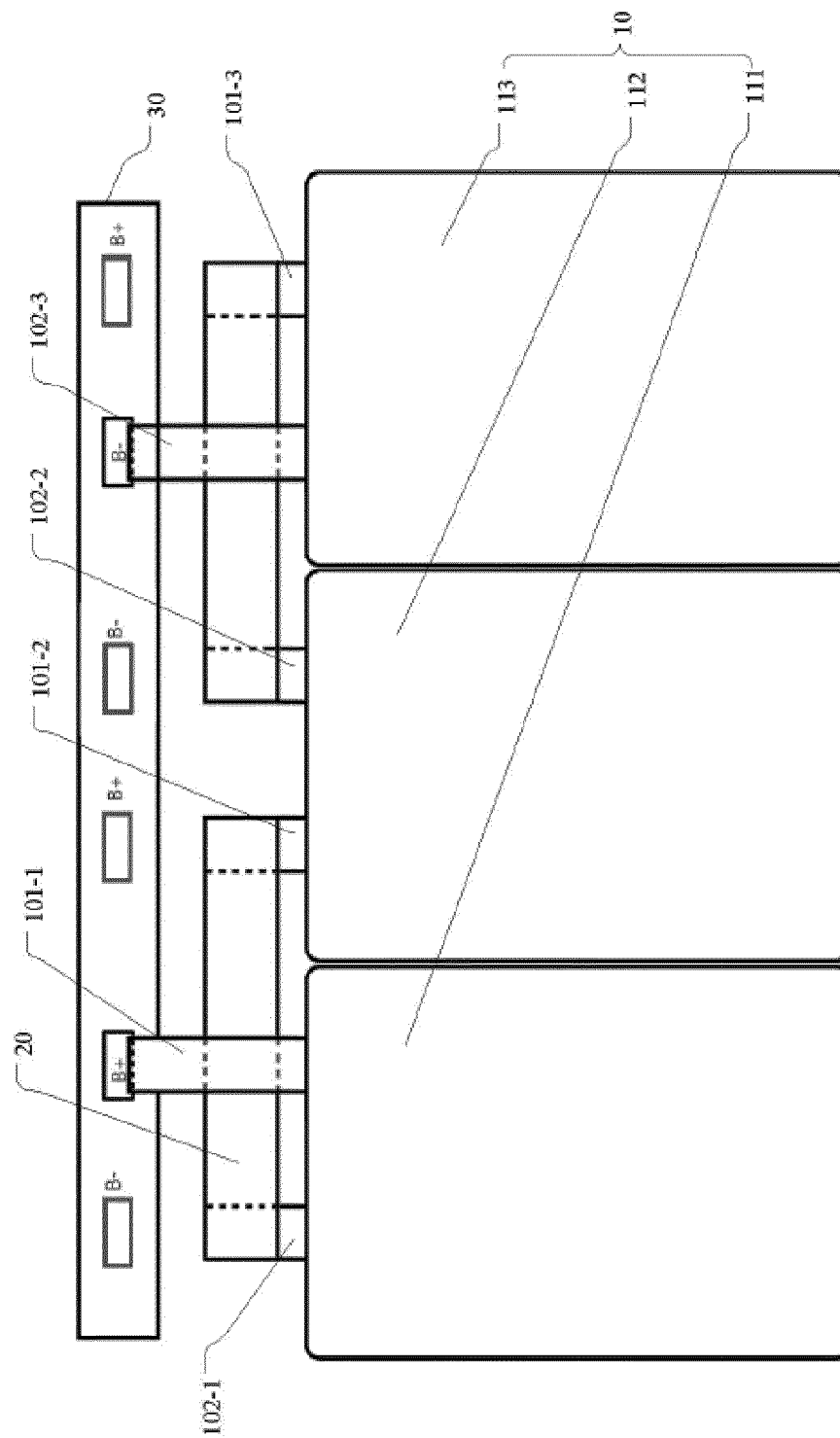


FIG. 3

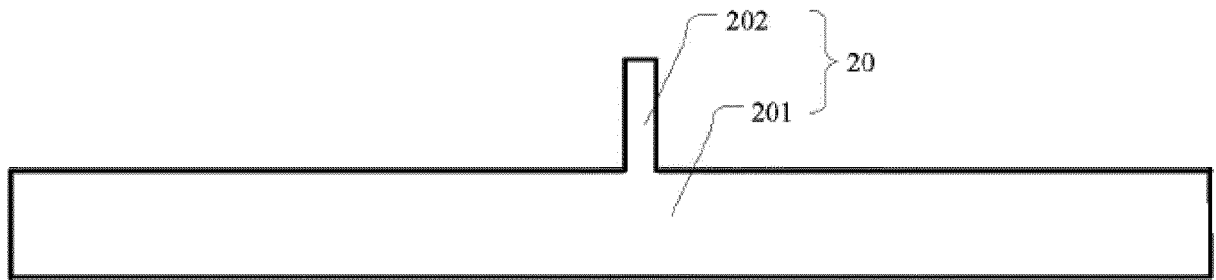


FIG. 4

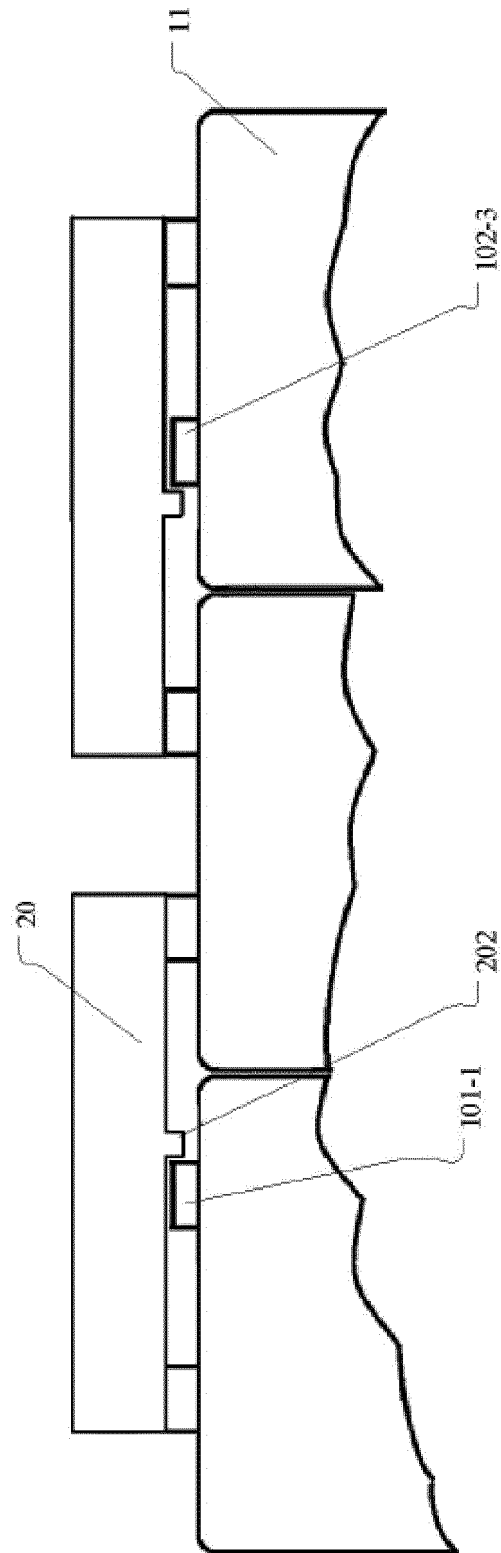


FIG. 5

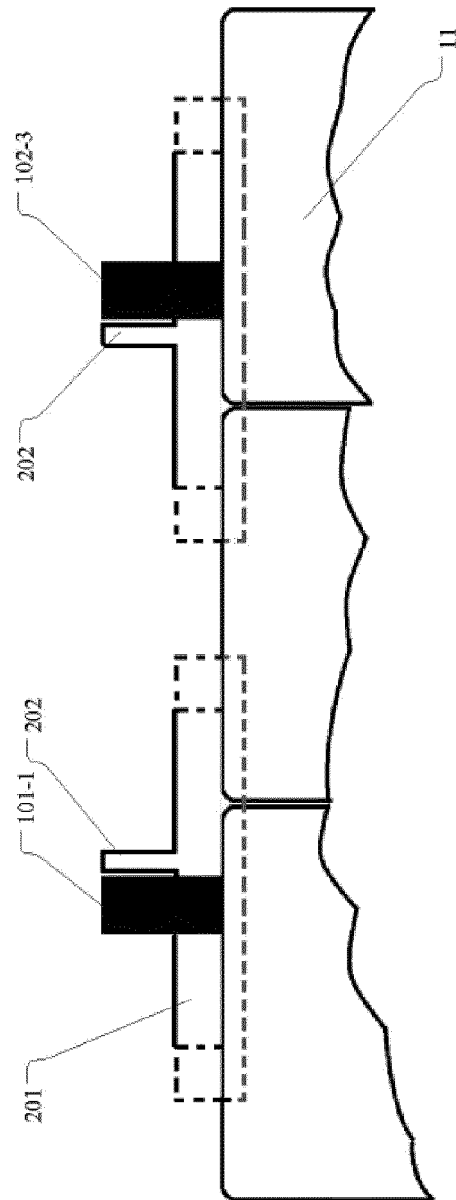


FIG. 6

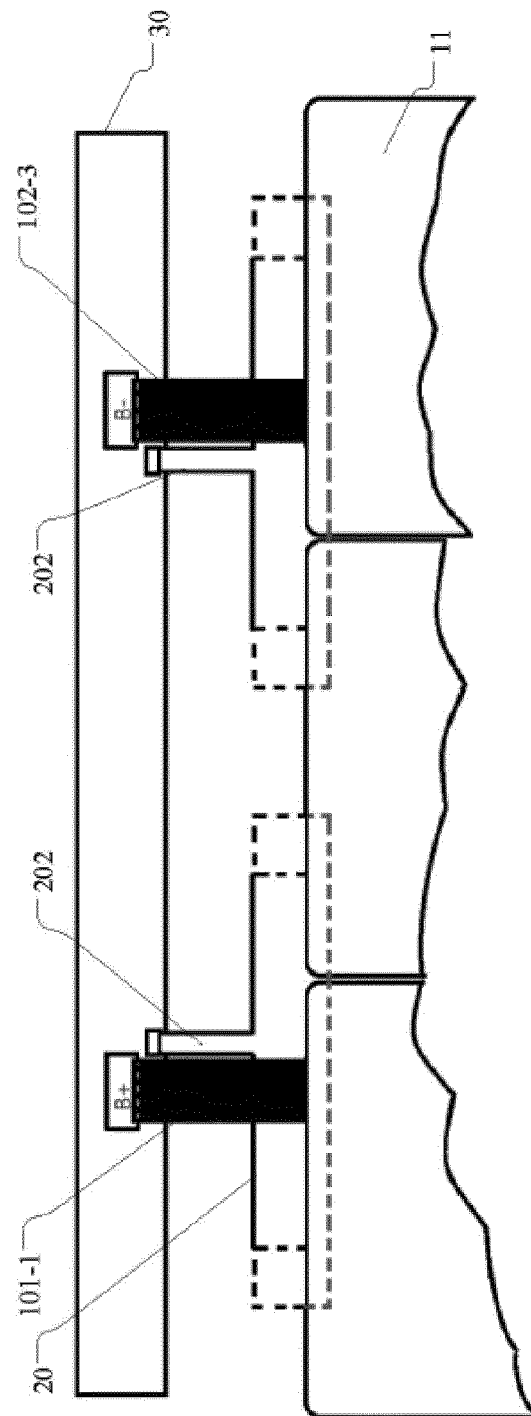


FIG. 7

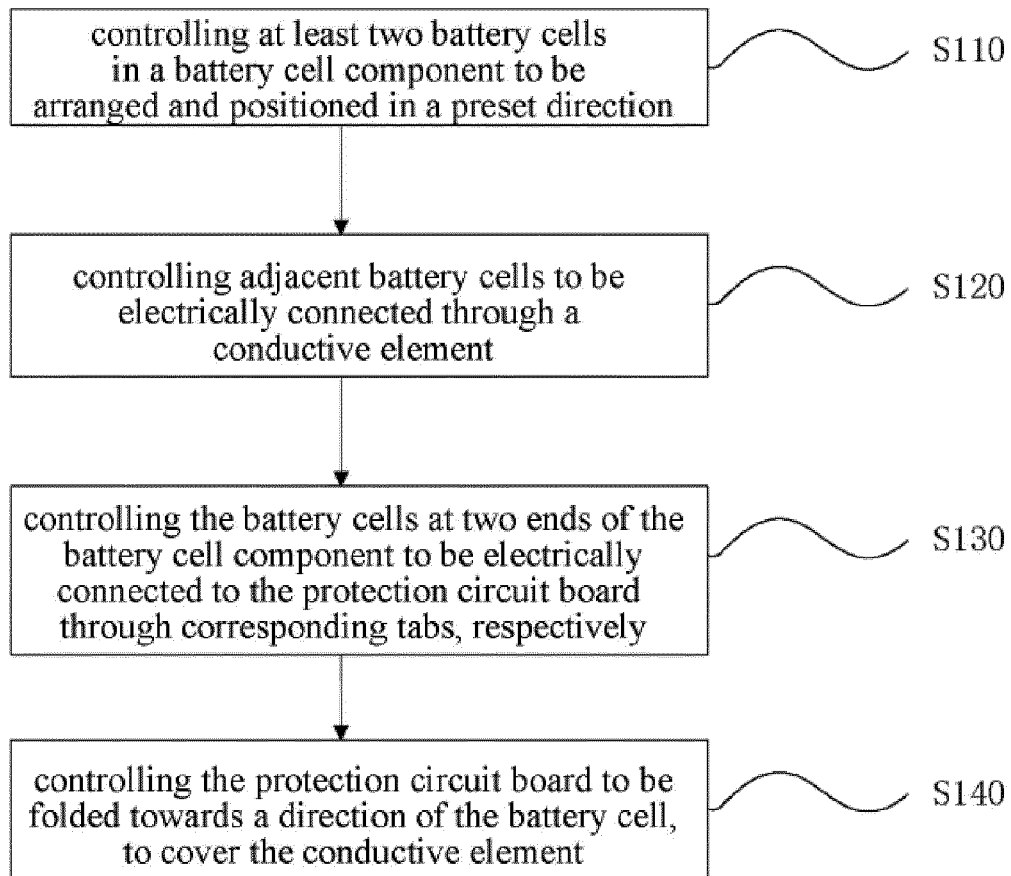


FIG. 8

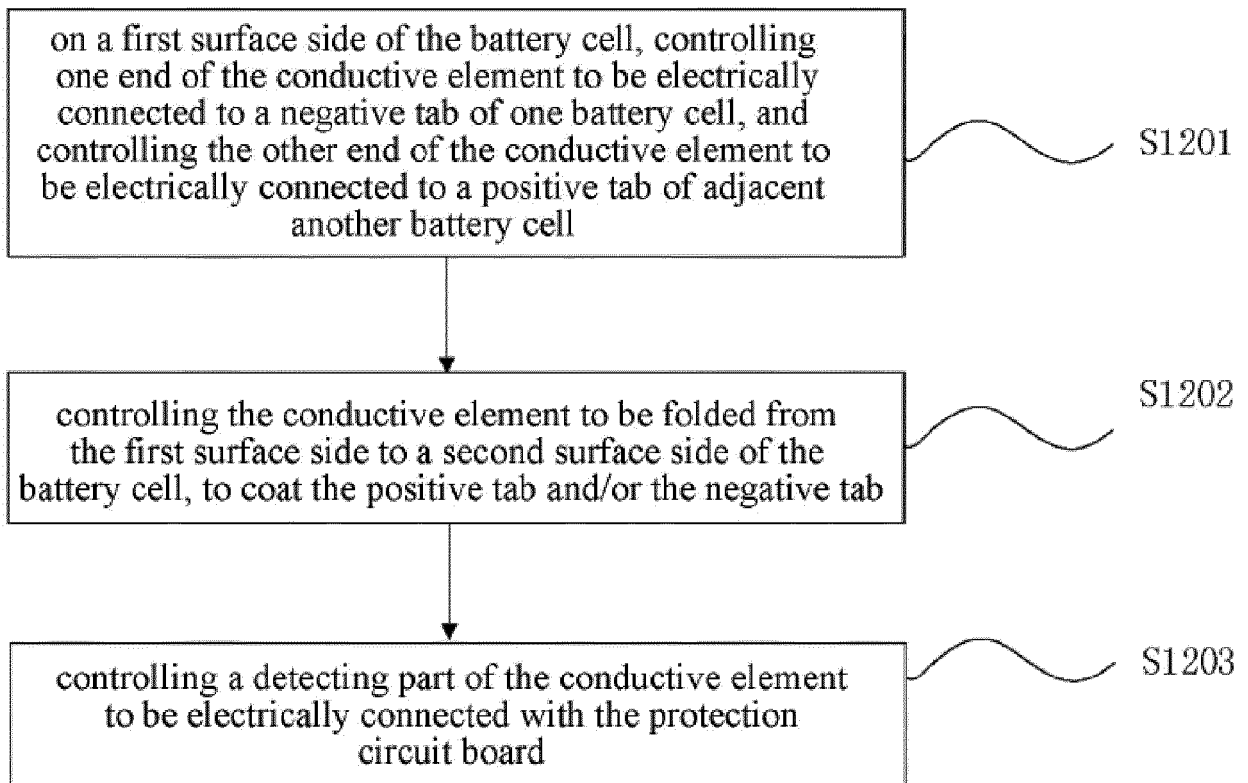


FIG. 9



EUROPEAN SEARCH REPORT

Application Number
EP 21 17 6869

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			H01M
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 October 2021	Examiner Mercedes González
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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